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FILE 'CAPLUS' ENTERED AT 17:06:53 ON 30 MAR 2004

L1 1471 TITRAT? (5A) (CONTINUOUS? OR IN-LINE OR ON-LINE OR IN-FLOW OR FLOW)

L2 3 L1 AND ((REVERS? OR INVERS?)(S) (RATIO OR PROPORT? OR VOLUME OF "FLOW RATE"))

L3 6 L1 AND (REVERS? OR INVERS?) AND (RATIO OR PROPORT? OR VOLUME OF "FLOW RATE")

L4 15 TRIANGLE (4A) FLOW (4A) TITRAT?

L5 162 (PEM OR POLYELECTROLYT?) (S) (MICROCHANNEL? OR PASSAGE? OR CAPILLAR?)

L6 20 L5 AND POSITIV?

L7 17 L6 AND NEGATIVE?

L7 ANSWER 8 OF 17 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:444350 CAPLUS

DOCUMENT NUMBER: 137:2713

TITLE: Apparatus for capillary electrophoresis and associated method

INVENTOR(S): Schlenoff, Joseph B.; Graul, Timothy W.

PATENT ASSIGNEE(S): USA

SOURCE: U.S., 22 pp., Cont.-in-part of U.S. Provisional Ser.
No. 108,528.

CODEN: USXXAM

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT NO. KIND DATE APPLICATION NO. DATE

US 6402918 B1 20020611 US 1999-442198 19991116

US 2002130045 A1 20020919 US 2002-145161 20020514

PRIORITY APPLN. INFO.: US 1998-108528P P 19981116

US 1999-442198 A3 19991116

AB An apparatus and method for capillary zone electrophoresis includes a polyelectrolyte multilayer positioned in a capillary tube for anal. sepns. of macromols. The capillary comprises a passage defined by passage walls comprising fused silica. The polyelectrolyte multilayer is positioned within the passage adjacent the walls, and comprises an organic polyelectrolyte. The passage may further comprise nonporous silica particles coated with a multilayer including a plurality of polyelectrolyte layers. An apparatus includes a power supply having a pos. electrode and a neg. electrode for generating an elec. field therebetween. The apparatus includes a capillary having a passage formed by passage walls and comprising therein a polyelectrolyte multilayer positioned substantially within the passage. The passage has a first end elec. connected to the pos. electrode and a second end elec. connected to the neg. electrode to thereby generate an elec. field through the passage. The apparatus also includes a sensor positioned adjacent the passage for sensing macromols. REFERENCE COUNT: 53

L7 ANSWER 9 OF 17 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:353921 CAPLUS

DOCUMENT NUMBER: 136:356136

TITLE: *Polyelectrolyte derivatization of microfluidic devices and microchannel device*

INVENTOR(S): *Locascio, Laurie E.; Barker, Susan L. R.; Ross, David; Tarlov, Michael J.*

PATENT ASSIGNEE(S): USA

SOURCE: *U.S. Pat. Appl. Publ., 12 pp.*

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

PATENT NO. KIND DATE APPLICATION NO. DATE

US 2002053514 A1 20020509 US 2001-881123 20010615

PRIORITY APPLN. INFO.: US 2000-232951P P 20000915

AB A microchannel device is provided with a plastic substrate having a microchannel. Polyelectrolyte multilayers are disposed along selected surfaces of the microchannel. The polyelectrolyte layers comprise alternating net pos. charged layers and net neg. charged layers; optimal modification of the microchannel surfaces was obtained by coating the channels with alternating layers of poly(allylamine hydrochloride) and poly(styrene sulfonate). A microchannel lid has a surface facing the microchannel. In making the microchannel device, selected surfaces of the microchannel are alternatively exposed to solns. comprising pos. charged polyelectrolytes and neg. charged polyelectrolytes to form the desired number of polyelectrolyte layers.

L7 ANSWER 10 OF 17 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:294329 CAPLUS

DOCUMENT NUMBER: 137:37782

TITLE: "Analytical Separations Using Molecular Micelles in Open-Tubular Capillary Electrochromatography"

AUTHOR(S): *Kapnissi, Constantina P.; Akbay, Cevdet; Schlenoff, Joseph B.; Warner, Isiah M.*

CORPORATE SOURCE: Department of Chemistry, Louisiana State University, Baton Rouge, LA, 70803, USA

SOURCE: **Analytical Chemistry (2002), 74(10), 2328-2335**

CODEN: ANCHAM; ISSN: 0003-2700

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Open-tubular capillary electrochromatog. (OT-CEC) is an alternative approach to conventional CEC. The primary advantage of OT-CEC is the elimination of problems associated with frits and silica particles in conventional CEC. This report is an investigation of the utility of using a polymeric surfactant (mol. micelle) for OT-CEC. In this approach, fused-silica capillaries coated with thin films of phys. adsorbed charged polymers are developed by use of a polyelectrolyte multilayer (PEM) coating procedure.

The PEM coating is constructed in situ by alternating rinses with pos. and neg. charged polymers, where the neg. charged polymer is a mol. micelle. This can offer a number of advantages for separation of hydrophobic analytes. In this study, poly(diallyldimethylammonium chloride) was used as the cationic polymer and poly(sodium N-undecanoyl-L-glycinate) was used as the anionic polymer for PEM coating. The performance of the modified capillaries as a separation medium is evaluated by use of seven benzodiazepines as analytes. The run-to-run, day-to-day, week-to-week, and capillary-to-capillary reproducibilities of electroosmotic flow are very good with relative standard deviation values of less than 1% in all cases. In addition, the chromatog. performance of the monomeric form of the mol. micelle is compared for the separation of these analytes. The PEM-coated capillary was remarkably robust with more than 200 runs accomplished in this study. Strong stability against extreme pH values was also observed. The general utility of this approach is discussed in detail. REFERENCE COUNT: 40

L7 ANSWER 11 OF 17 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:434349 CAPLUS

DOCUMENT NUMBER: 135:181591

TITLE: Fabrication, derivatization, and applications of plastic microfluidic devices

AUTHOR(S): Barker, Susan L. R.; Tarlov, Michael J.; Ross, David; Johnson, Timothy; Waddell, Emanuel; Locascio, Laurie E.

CORPORATE SOURCE: National Institute of Standards and Technology, Gaithersburg, MD, 20899, USA

SOURCE: Proceedings of SPIE-The International Society for Optical Engineering (2001), 4205(Advanced Environmental and Chemical Sensing Technology), 112-118

CODEN: PSISDG; ISSN: 0277-786X

PUBLISHER: SPIE-The International Society for Optical Engineering

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Control of the polymer surface chemical is a crucial aspect in the development of plastic microfluidic devices. When com. available plastic substrates were used to fabricate microchannels, differences in the electroosmotic flow from plastic to plastic can be very high. Therefore, the authors used polyelectrolyte multilayers (PEMs) to alter the surface of microchannels fabricated in plastics. The PEMs are easily fabricated and provide a means for controlling the flow direction and the electroosmotic mobility in the channels. Optimal modification of the microchannel surfaces was obtained by coating the channels with alternating layers of poly(allylamine hydrochloride) and poly(styrene sulfonate). The efficacy of the surface modification was evaluated by measuring the electroosmotic flow mobility. When microchannels prepared in different polymer substrates were modified with PEMs, they demonstrated very similar electroosmotic mobilities. The PEMs also were used to immobilize chemical selective mols. in the microchannels. In addition, relatively complex flow patterns, with simple arrangements of applied voltages, were realized by derivatization of different arms of a single device with oppositely charged polyelectrolytes. Flow in opposite directions in the same channel is also possible; a pos. derivatized plastic substrate with a neg. charged lid was used to achieve top-bottom opposite flows. REFERENCE COUNT: 18

L7 ANSWER 12 OF 17 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:222311 CAPLUS

DOCUMENT NUMBER: 135:61854

TITLE: Molecular weight analysis of polycations by capillary electrophoresis in a solution of neutral polymers

AUTHOR(S): Welch, C. F.; Hoagland, D. A.

CORPORATE SOURCE: Department of Polymer Science and Engineering, Silvio Conte National Center for Polymer Research, Box 34530, University of Massachusetts Amherst, Amherst, MA, 01003, USA

SOURCE: Polymer (2001), 42(13), 5915-5920

CODEN: POLMAG; ISSN: 0032-3861

PUBLISHER: Elsevier Science Ltd.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Under appropriate conditions, polyelectrolytes sep. according to mol. weight during their electrophoretic migration through a dilute solution of inert neutral polymers. These sepsns. facilitate a new capillary electrophoresis-based approach for high resolution and high throughput polyelectrolyte mol. weight anal., one theor. applicable to both polyanions and polycations. Although pioneered for DNA, a polyanion, the new method is discussed here in the context of synthetic polycations. Numerous exptl. difficulties evolve from the introduction of pos. solute charge, not the least of which is a strong tendency for solute adsorption on the neg. capillary walls. The adsorption can be overcome by using a run buffer with a cationic surfactant that forms a dynamic yet stable pos. wall coating. Feasible at nearly any pH, the surfactant approach enables robust and high-resolution polycation anal. For illustration, we compare the separation at low pH of three protonated poly(2-vinylpyridine)s to the separation at neutral pH of the same polymers after quaternization. A good match is found. Further, electrophoretic analyses by the new method suggest how poly(2-vinylpyridine)s degrade/crosslink when exposed to quaternizing conditions for an excessive period. REFERENCE COUNT: 35

L7 ANSWER 13 OF 17 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2000:793449 CAPLUS

TITLE: Laser ablation of polymer substrates for the fabrication of microfluidic devices.

AUTHOR(S): Waddell, Emanuel A.; Barker, Susan L. R.; Ross, David J.; Locascio, Laurie E.; Kramer, Gary W.

CORPORATE SOURCE: Analytical Chemistry Division, National Institute of Standards and Technology, Gaithersburg, MD, 20899-8394, USA

SOURCE: Abstracts of Papers - American Chemical Society (2000), 220th, ANYL-086

CODEN: ACSRAL; ISSN: 0065-7727

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal; Meeting Abstract

LANGUAGE: English

AB We have successfully fabricated and characterized microchannels in polymeric materials using laser ablation. The laser-ablated channels were fabricated with the use of a KrF laser (248 nm). We examined the phys., chemical, and electroosmotic flow characteristics of the microchannels formed in copolyester, polystyrene, polycarbonate,

and poly (methacrylate) using this technique. Microchannel surface chemical was also modified by deposition of polyelectrolyte multilayers (PEMS) on the channel walls. The multilayer was created by exposing a surface to alternating solns. of pos. and neg. charged polyelectrolytes. Although the layers are merely adsorbed onto the substrate or previous layer, the resulting multilayers have multiple bonds and are very stable and uniform. The efficacy of the surface modification has been evaluated using XPS. This presentation will compare the differences observed in each polymer as characterized by optical profilometry, contact angle measurements, and chemical mapping of ablated polymers.

L7 ANSWER 14 OF 17 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2000:786242 CAPLUS

DOCUMENT NUMBER: 133:337107

TITLE: Control of Flow Direction in Microfluidic Devices with Polyelectrolyte Multilayers

AUTHOR(S): Barker, Susan L. R.; Ross, David; Tarlov, Michael J.; Gaitan, Michael; Locascio, Laurie E.

CORPORATE SOURCE: National Institute of Standards Technology,
Gaithersburg, MD, 20899-8362, USA

SOURCE: Analytical Chemistry (2000), 72(24), 5925-5929

CODEN: ANCHAM; ISSN: 0003-2700

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Electroosmotic flow (EOF) is commonly utilized in microfluidics. Because the direction of the EOF can be determined by the substrate surface charge, control of the surface chemical state offers the potential, in addition to voltage control, to direct the flow in microfluidic devices. The use is reported of polyelectrolyte multilayers (PEMs) to alter the surface charge and control the direction of flow in polystyrene and acrylic microfluidic devices. Relatively complex flow patterns with simple arrangements of applied voltages are realized by derivatization of different arms of a single device with oppositely charged polyelectrolytes. In addition, flow in opposite directions in the same channel is possible. A pos. derivatized plastic substrate with a neg. charged lid was used to achieve top-bottom opposite flows. Derivatization of the two sides of a plastic microchannel with oppositely charged polyelectrolytes was used to achieve side-by-side opposite flows. The flow is characterized by using fluorescence imaging and particle velocimetry. REFERENCE COUNT: 21

L7 ANSWER 15 OF 17 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1999:542126 CAPLUS

TITLE: Polyelectrolyte multilayer coatings for capillary zone electrophoresis.

AUTHOR(S): Schlenoff, Joseph B.; Graul, Timothy W.; Howell, Peter B.

CORPORATE SOURCE: Chemistry Department and Center for Materials Research and Technology (MARTECH), The Florida State University, Tallahassee, FL, 32306, USA

SOURCE: Book of Abstracts, 218th ACS National Meeting, New Orleans, Aug. 22-26 (1999), MACR-027. American Chemical Society: Washington, D. C.

CODEN: 67ZJA5

DOCUMENT TYPE: Conference; Meeting Abstract

LANGUAGE: English

AB Fused silica capillaries coated with thin films of phys. adsorbed charged polymers exhibit exceptional properties for electrophoretic sepns. The coating is a polyelectrolyte multilayer, constructed in situ by alternating rinses with pos.- and neg.- charged polymers. The direction of the electroosmotic flow oscillates as the multilayer surface charge alternates in polarity during buildup. Apparent surface charge, deduced from the electroosmotic mobility, is considerably less than the nominal surface charge of the film. Mechanisms limiting this apparent surface charge for a buffer-permeable layer will be discussed. The multilayer-coated columns exhibit many desirable features, in addition to ease of construction and reproducible control of electroosmotic flow: stable flow rates are achieved immediately on exposure of the column to running buffer, and reversed flow is possible. Columns are also found to be stable to extremes of pH and ionic strength, and to dehydration/rehydration. A series of basic proteins are separated with good efficiency, demonstrating column resistance to irreversible protein adsorption.

L7 ANSWER 16 OF 17 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1999:510786 CAPLUS

DOCUMENT NUMBER: 131:193469

TITLE: Capillaries modified by polyelectrolyte multilayers for electrophoretic separations

AUTHOR(S): Graul, Timothy W.; Schlenoff, Joseph B.

CORPORATE SOURCE: Department of Chemistry and Center for Materials Research and Technology (MARTECH), The Florida State University, Tallahassee, FL, 32306-4390, USA

SOURCE: Analytical Chemistry (1999), 71(18), 4007-4013

CODEN: ANCHAM; ISSN: 0003-2700

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Fused silica capillaries coated with thin films of phys. adsorbed charged polymers are employed for capillary zone electrophoretic sepns. The coating is a polyelectrolyte multilayer, constructed in situ by alternating rinses with pos. and neg. charged polymers. The thickness of the multilayer and amount of surface charge is controlled by the concentration of salt in the deposition solns. The direction of the electroosmotic flow oscillates as the multilayer surface charge alternates in polarity during buildup. The apparent surface charge, deduced from the electroosmotic mobility, is considerably less than the nominal surface charge of the film. Mechanisms limiting this apparent surface charge for a buffer-permeable layer are discussed. The multilayer-coated columns exhibit many desirable features in addition to ease of construction and reproducible control of electroosmotic flow: stable flow rates are achieved immediately on exposure of the column to running buffer, and reversed flow is possible. Columns also are stable to extremes of pH and ionic strength, and to dehydration/rehydration. Basic proteins are

separated with good efficiency, demonstrating column resistance to irreversible protein adsorption. Partitioning and separation of neutral solutes using thicker films is demonstrated. REFERENCE COUNT: 51

L7 ANSWER 17 OF 17 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1995:554837 CAPLUS

DOCUMENT NUMBER: 123:153612

TITLE: Wall adsorption in capillary electrophoresis. Experimental study and computer simulation

AUTHOR(S): Ermakov, Sergey V.; Zhukov, Michael Yu.; Capelli, Laura; Righetti, Pier Giorgio

CORPORATE SOURCE: Department of Cell Biology, University of Calabria, Arcavacata di Rende (Cosenza), 87030, Italy

SOURCE: Journal of Chromatography, A (1995), 699(1 + 2), 297-313

CODEN: JCRAEY; ISSN: 0021-9673

PUBLISHER: Elsevier

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A semi-quant. model based on non-linear equilibrium chromatog. coupled with diffusion-driven sample sorption at the wall was developed to account for and predict potential binding of an analyte to the wall in capillary electrophoresis. It was then used for computer simulation of sample concentration profiles corresponding to different exptl. conditions (sorption kinetics, capillary length, wall capacity, initial sample concentration). The binding phenomena were also studied exptl. by anal. of the sample peak shape (including peak height and area). Contrary to expectations, the interaction of small monovalent cations with the charged capillary wall does not lead to strong adsorption, as the sample mass is not lost during experiment and the peak shape remains close to that which one can expect in the absence of interaction. For polycations (e.g., poly-L-histidine) at any pH at > 3 , sample adsorption is evident by a lack of return of the baseline to zero, after peak passage, with progressively higher levels at progressively increasing buffer pH values. Upon several runs with a polycation, the surface charge on the wall changes from neg. to pos., as evidenced by reversal of electroosmotic flow. However, even under these last conditions, the sample-wall interaction was rather strong. The influence of NaOH washing and the addition of different substances (urea, Tween 20, NaCl) on adsorption was studied. The comparison between simulated results and exptl. data is discussed.

L1 ANSWER 1 OF 1 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:519759 CAPLUS

DOCUMENT NUMBER: 135:134248

TITLE: "Controlled modification of microstructured silicon surfaces for confinement of biological macromolecules and liquid crystals"

AUTHOR(S): *Pfohl, T.; Kim, J. H.; Yasa, M.; Miller, H. P.; Wong, G. C. L.; Bringezu, F.; Wen, Z.; Wilson, L.; Kim, M. W.; Li, Y.; Safinya, C. R.*

CORPORATE SOURCE: Materials Research Laboratory Materials Department
Physics Department and Biomolecular Science and Engineering Program, University of
California, Santa Barbara, CA, 93106, USA

SOURCE: *Langmuir* (2001), 17(17), 5343-5351

CODEN: LANGD5; **ISSN:** 0743-7463

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB We report new methods of surface modifications for confining and aligning biol. macromols. and liquid crystals on microstructured surfaces. Microcontact printing and polyelectrolyte adsorption were used to pattern and control surface properties of silicon microchannels fabricated by photolithog. and etching. We show that the wettability inside and on top of the microstructures can be independently varied by selective deposition of a hydrophobic monolayer using microcontact printing, whereas the surface charge, reactivity, and biocompatibility in the microchannels can be adjusted by adsorbing polyelectrolytes to the surface. A near ideal contrast in surface properties was achieved by microcontact printing on preadsorbed polyelectrolyte layers. Three-dimensional laser scanning confocal microscopy was used to characterize the wetting behavior of biol. macromols. (lipids, DNA, microtubules) confined in the microstructures. DNA mols. in concentrated solns. were observed to orient along the microchannels, as a result of surface confinement, when their contour length approached the width of the microchannels. We demonstrate that the surface microstructures may be used to control the mesoscopic defect structures and defect sizes of liquid crystals by studying the defect structure of 8CB (4'-n-octyl-4-cyanobiphenyl) as a function of the widths and depths of the microchannels. The order induced due to microchannel confinement of biol. mols. has the potential of resulting in unique structure characterization of highly oriented biol. macromols. using synchrotron x-ray microdiffraction methods. **REFERENCE COUNT:** 44

L2 ANSWER 2 OF 13 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2003:998473 **CAPLUS**

DOCUMENT NUMBER: 140:82635

TITLE: Surface chemistry in polymer microfluidic systems

AUTHOR(S): Locascio, Laurie E.; Henry, Alyssa C.; Johnson, Timothy J.; Ross, David

CORPORATE SOURCE: Analytical Chemistry Division, National Institute of
Standards and Technology, Gaithersburg, MD, 20899, USA

SOURCE: *Lab-on-a-Chip* (2003), 65-82. **Editor(s):** Oosterbroek, R. Edwin; Van den
Berg, Albert. Elsevier: Amsterdam, Neth.

CODEN: 69EXTW; **ISBN:** 0-444-51100-8

DOCUMENT TYPE: Conference; General Review

LANGUAGE: English

AB A review is given of the surface chemical in microfluidic polymer systems. Topics discussed include surface chemical of native polymers (polymer classification, surface chemical and polymer microfluidic channels), energetic surface treatments (UV irradiation, plasma treatments), covalent modification of polymer surfaces (reactions with

pendant groups, chain-breaking reactions), and noncovalent modification (protein and surfactant coatings, polyelectrolyte multilayers). REFERENCE COUNT: 103

L2 ANSWER 10 OF 13 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2000:786242 CAPLUS

DOCUMENT NUMBER: 133:337107

TITLE: "Control of Flow Direction in Microfluidic Devices with Polyelectrolyte Multilayers"

AUTHOR(S): *Barker, Susan L. R.; Ross, David; Tarlov, Michael J.; Gaitan, Michael; Locascio, Laurie E.*

CORPORATE SOURCE: National Institute of Standards Technology,
Gaithersburg, MD, 20899-8362, USA

SOURCE: **Analytical Chemistry (2000), 72(24), 5925-5929**

CODEN: ANCHAM; ISSN: 0003-2700

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Electroosmotic flow (EOF) is commonly utilized in microfluidics. Because the direction of the EOF can be determined by the substrate surface charge, control of the surface chemical state offers the potential, in addition to voltage control, to direct the flow in microfluidic devices. The use is reported of polyelectrolyte multilayers (PEMs) to alter the surface charge and control the direction of flow in polystyrene and acrylic microfluidic devices. Relatively complex flow patterns with simple arrangements of applied voltages are realized by derivatization of different arms of a single device with oppositely charged polyelectrolytes. In addition, flow in opposite directions in the same channel is possible. A pos. derivatized plastic substrate with a neg. charged lid was used to achieve top-bottom opposite flows. Derivatization of the two sides of a plastic microchannel with oppositely charged polyelectrolytes was used to achieve side-by-side opposite flows. The flow is characterized by using fluorescence imaging and particle velocimetry. REFERENCE COUNT: 21

L4 ANSWER 3 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:596678 CAPLUS

DOCUMENT NUMBER: 138:250824

TITLE: BioMEMS: marrying ICs and biotech

AUTHOR(S): Campitelli, Andrew; Parton, Els

CORPORATE SOURCE: IMEC, Louvain, Belg.

SOURCE: Solid State Technology (2002), 45(7), 87-88, 90, 92

CODEN: SSTEAP; ISSN: 0038-111X

PUBLISHER: PennWell Corp.

DOCUMENT TYPE: Journal; General Review

LANGUAGE: English

AB A review. BioMEMS (biol. microelectromech. systems), and biosensor systems in particular, will offer an important tool in the future of medicine, anal. chemical, and environmental screening. At their heart is a biosensor module, or BioSiP (Biosensor-System-in-a-Package), in which microfluidics, transducer and a biol. top layer are

packaged. Together with the development of organic transducers and good immobilization techniques, this package concept is the key to the faster, smaller, cheaper biosensors the market is demanding for applications such as detecting ionic charge, neutral biochem. compds., antigens, and DNA-sequences. Apart from pharmaceutical applications, biosensors will also be used for environmental screening, in the food and drink industry, as a follow-up to the fermentation process, in agriculture, and for military applications.

L4 ANSWER 7 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:101030 CAPLUS

DOCUMENT NUMBER: 134:159827

TITLE: Microfluid multi-channel support with transparent cover for the light-controlled synthesis and analysis of oligomer arrays

INVENTOR(S): Stahler, Cord Friedrich; Muller, Manfred; Stahler, Peer Friedrich

PATENT ASSIGNEE(S): Febit Ferrarius Biotechnology Gmbh, Germany

SOURCE: PCT Int. Appl., 55 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: German

PATENT NO. KIND DATE APPLICATION NO. DATE

WO 2001008799 A1 20010208 WO 2000-EP7445 20000801

WO 2001008799 C2 20020906

DE 19935433 A1 20010301 DE 1999-19935433 19990801

EP 1198294 A1 20020424 EP 2000-953136 20000801

PRIORITY APPLN. INFO.: DE 1999-19935433 A 19990801

WO 2000-EP7445 W 20000801

AB The invention concerns a microfluid support for the light-controlled synthesis and anal. of oligomers, oligonucleotides and polymers that is composed of layers of microchannels enabling the transport of reagents and products. The system is covered by a transparent glass or plastic microlense array; it contains glass fiber channels and silicon connecting layers; for detection a CCD matrix layer is built-in. The synthesis products are DNA, RNA, their analogs, PNA, peptides and saccharides in form of probe-arrays. Oligonucleotide arrays are used for hybridization and their detection. Detailed description of the support is given. REFERENCE COUNT: 4

L6 ANSWER 5 OF 19 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2003:675597 CAPLUS

DOCUMENT NUMBER: 139:190231

TITLE: Mobile phase gradient generation microfluidic device

INVENTOR(S): Yin, Hongfeng; Killeen, Kevin; Sobek, Daniel

PATENT ASSIGNEE(S): Agilent Technologies, Inc., USA

SOURCE: Eur. Pat. Appl., 25 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: English

PATENT NO. KIND DATE APPLICATION NO. DATE

EP 1338894 A2 20030827 EP 2003-251113 20030225
US 2003159993 A1 20030828 US 2002-85598 20020226
PRIORITY APPLN. INFO.: US 2002-85598 A 20020226

AB The present invention relates to a microfluidic device for separating the components of a fluid sample. A cover plate is arranged over the 1st surface of a substrate, which, in combination with a microchannel formed in the 1st surface, defines a separation conduit for separating the components of the fluid sample. An inlet port in fluid communication with the separation conduit allows a mobile phase containing a gradient of a selected mobile-phase component to be introduced from an integrated gradient-generation means to the separation conduit. A method is also provided for separating the components of a fluid sample using a mobile phase containing a gradient of a selected mobile-phase component, wherein the gradient is generated within a small volume of mobile phase.

L6 ANSWER 16 OF 19 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:101030 CAPLUS

DOCUMENT NUMBER: 134:159827

TITLE: "Microfluid multi-channel support with transparent cover for the light-controlled synthesis and analysis of oligomer arrays"

INVENTOR(S): *Stahler, Cord Friedrich; Muller, Manfred; Stahler, Peer Friedrich*

PATENT ASSIGNEE(S): Febit Ferrarius Biotechnology Gmbh, Germany

SOURCE: PCT Int. Appl., 55 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: German

PATENT NO. KIND DATE APPLICATION NO. DATE

WO 2001008799 A1 20010208 **WO 2000-EP7445** 20000801
WO 2001008799 C2 20020906

DE 19935433 A1 20010301 DE 1999-19935433 19990801

EP 1198294 A1 20020424 EP 2000-953136 20000801

PRIORITY APPLN. INFO.: DE 1999-19935433 A 19990801

WO 2000-EP7445 W 20000801

AB The invention concerns a microfluid support for the light-controlled synthesis and anal. of oligomers, oligonucleotides and polymers that is composed of layers of microchannels enabling the transport of reagents and products. The system is covered by a transparent glass or plastic microlense array; it contains glass fiber channels and silicon connecting layers; for detection a CCD matrix layer is built-in. The synthesis products are DNA, RNA, their analogs, PNA, peptides and saccharides in form of probe-arrays. Oligonucleotide arrays are used for hybridization and their detection. Detailed description of the support is given. REFERENCE COUNT: 4

L6 ANSWER 17 OF 19 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2000:811317 CAPLUS

DOCUMENT NUMBER: 134:94778

TITLE: "Liquid flow through an array-based chemical sensing system"

AUTHOR(S): *Sohn, Young-Soo; Tsao, Andrew; Anslyn, Eric V.; McDevitt, John Thomas; Shear, Jason B.; Neikirk, Dean P.*

CORPORATE SOURCE: Department of Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX, 78712, USA

SOURCE: **Proceedings of SPIE-The International Society for Optical Engineering (2000), 4177(Microfluidic Devices and Systems III), 212-219**

CODEN: PSISDG; ISSN: 0277-786X

PUBLISHER: SPIE-The International Society for Optical Engineering

DOCUMENT TYPE: Journal

LANGUAGE: English

AB A micromachined fluidic sensor array for the rapid characterization of multiple analytes in solution was developed. A simple micromachined fluidic structure for this biol. and chemical agent detection system was designed and fabricated, and the system was tested. Sensing occurs via optical changes to indicator mols. that are attached to polymeric microspheres (beads). A sep. charged-coupled- device (CCD) is used for the simultaneous acquisition of the optical data from the selectively arranged beads in micromachined etch cavities. The micromachined bead support structure was designed to be compatible wit this hybrid optical detection system. The structure consists of four layers: cover glass, micromachined silicon, dry film photoresist, and glass substrate. The bottom three layers are fabricated 1st, and the beads are selectively placed into micromachined etch cavities. Finally, the cover glass is applied to confine the beads. This structure uses a hydrophilic surface of the cover glass to draw a liquid sample into the sensor array without moving components, producing a compact, reliable, and potentially low-cost device. The authors have initially characterized fluid flow through a complete chip, showing complete filling of the sample chamber in .apprx.2 s. The test results show that this system may be useful in micro total anal. systems (<SYM109>-TAS), especially in single-use biomedical applications. REFERENCE COUNT: 6

L6 ANSWER 18 OF 19 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2000:786242 CAPLUS

FILE 'CAPLUS' ENTERED AT 15:18:28 ON 13 JUN 2004

L1 1 POLYELECTROL? (S) MICROCHANNEL? (S) (LID? OR COVER? OR TOP? OR CLOSURE?)

L2 13 POLYELECTROL? AND (MICROCHANNEL? OR CHANNEL?) AND (LID? OR COVER? OR TOP? OR CLOSURE?)

L3 89 MICROFLUID? (S) (LID? OR COVER? OR TOP? OR CLOSURE?)

L4 7 SEA ABB=ON PLU=ON L3 AND CHARG?

L5 319 MICROFLUID? AND (LID? OR COVER? OR TOP? OR CLOSURE?)

L6 19 L5 AND CHARG?

L7 16 POLYELECTROL? (S) MICROCHANNEL?

L8 4 L7 AND STYRENE?

L9 17 POLYELECTROL? AND (CHANNEL? OR MICROFLUID? OR MICROCHANNEL?) AND (LID? OR COVER? OR TOP?)

L9 ANSWER 6 OF 17 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:335106 CAPLUS

DOCUMENT NUMBER: 137:47679

TITLE: Electrophoretic Separation of Long Polyelectrolytes in Submolecular-Size Constrictions: A Monte Carlo Study

AUTHOR(S): Tessier, Frederic; Labrie, Josee; Slater, Gary W.

CORPORATE SOURCE: Department of Physics, University of Ottawa, Ottawa, ON, K1N 6N5, Can.

SOURCE: Macromolecules (2002), 35(12), 4791-4800

CODEN: MAMOBX; ISSN: 0024-9297

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB We use a bond-fluctuation Monte Carlo method to study the motion of long polyelectrolytes inside an array of microscopic entropic traps. The mols. are pulled through the array by an elec. field and forced into submol.-size constrictions between the larger trap regions. We numerically solve the Laplace equation inside the structure to obtain realistic field lines for our simulations. We find that the mobility of the mols. increases with mol. size and that the size-separation mechanism relies mainly on the overall deformation of the mols. as they approach the narrow constrictions. We also investigate specific aspects of the separation mechanism, namely the conformational behavior of the mol., the hernia nucleation process, and the trapping time statistics as a function of mol. size and field strength. Our simulation results for the mobility, the critical hernia nucleation size, the mean trapping time, and the resolution are consistent with the exptl. data and model previously published by Han et al. Finally, we predict that such microfluidic structures could be used to sep. topoisomers bearing the same mol. size. REFERENCE COUNT: 25

L9 ANSWER 9 OF 17 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:636957 CAPLUS

TITLE: Entropic and hydrodynamic effects in micro- and nano-fluidic systems

AUTHOR(S): Slater, Gary W.; Tessier, Frederic

CORPORATE SOURCE: Department of Physics, University of Ottawa, Ottawa, ON, K1N 6N5, Can.

SOURCE: Abstracts of Papers, 222nd ACS National Meeting, Chicago, IL, United States, August 26-30, 2001 (2001), ANYL-159. American Chemical Society: Washington, D.C.

CODEN: 69BUZP

DOCUMENT TYPE: Conference; Meeting Abstract

LANGUAGE: English

AB Separation devices with mol.-size features allow us to use new phys. phenomena to improve separation or simply move mols. between different parts of integrated microfluidic systems. In this presentation, I will look at the interplay between entropic and hydrodynamic effects when polyelectrolytes (such as DNA fragments) are electrophoresed in micro- and nano-fluidic systems. As an example, the results from a Monte Carlo simulation study of a recent microfluidic device designed and tested by Craighead's group (<http://www.hgc.cornell.edu/biofab/entropic.htm>) will be presented. We will see that the separation process is such that it should also allow the separation of

topoisomers. Possible non-trivial modifications to the systems will be examined. Finally, other examples of potentially useful entropic effects that could also be exploited in small devices will be discussed.

FILE 'CAPLUS' ENTERED AT 15:38:43 ON 14 JUN 2004
L1 61 POLYELECTROLYT? AND POLYALLYLAMINE? AND POLYSTYRENE
L2 38 L1 AND SULFONATE

L2 ANSWER 38 OF 38 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 1995:271343 CAPLUS
DOCUMENT NUMBER: 122:32594
TITLE: "Ellipsometry and x-ray reflectometry characterization of self-assembly process of polystyrene sulfonate and polyallylamine"
AUTHOR(S): *Tronin, A.; Lvov, Y.; Nicolini, C.*
CORPORATE SOURCE: Inst. Biophysics, Univ. Genoa, Italy
SOURCE: **Colloid and Polymer Science (1994), 272(10), 1317-21**
CODEN: CPMSB6; ISSN: 0303-402X
PUBLISHER: Steinkopff
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Self-assembly of polyelectrolytes-poly(styrene sulfonate) (PSS) and poly(allyl amine) (PAH) with added salts of MnCl and NaBr was studied by x-ray reflectometry and ellipsometry technique. The thickness of PSS-PAH bilayer was measured to be 5.1 ± 0.2 nm according to reflectometry and 6.1 ± 0.7 nm according to ellipsometry. The discrepancy in data is attributed to the difference in the interaction of the interfaces with x-rays and visible light. The films are found to be rather homogeneous and the deposition process regular. The refraction indexes of the deposited films were found to be $n_0 = 1.50 \pm 0.05$, $k_0 = 0.07 \pm 0.05$, $n_e = 1.53 \pm 0.05$, $k_e = 0$, optical axis being perpendicular to the surface. The values of refractivity characterize the whole film (up to seven bilayers) and do not vary with increasing thickness.

L2 ANSWER 36 OF 38 CAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 1998:357145 CAPLUS
DOCUMENT NUMBER: 129:127521
TITLE: Layer-by-layer self assembly of polyelectrolytes on colloidal particles
AUTHOR(S): Sukhorukov, Gleb B.; Donath, Edwin; Lichtenfeld, Heinz; Eberhard Knippel; Knippel, Monika; Budde, Axel; Mohwald, Helmuth
CORPORATE SOURCE: Rudower Chaussee 5, MPI für Kolloid- und Grenzflächenforschung, Berlin, D-1 2489, Germany
SOURCE: **Colloids and Surfaces, A: Physicochemical and Engineering Aspects (1998), 137(1-3), 253-266**
CODEN: CPEAEH; ISSN: 0927-7757
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Polyelectrolytes have been consecutively adsorbed onto charged polystyrene latex particles, forming stable ultrathin multilayer films. Film growth has been followed by electrophoresis, dynamic light scattering, single particle light scattering and fluorescence intensity measurements. Desorption of bound polyelectrolytes has been followed by HPLC. A low percentage of particle aggregates were found if a centrifugation-based technique was applied, whereas a larger number of particle aggregates were observed if polyelectrolytes were consecutively added at saturating concns. and if centrifugation was avoided. Single particle light scattering allowed for adsorption layer thickness determination. If a layer refractive index of 1.47 was assumed the thickness of a poly(allylamine hydrochloride)/poly(styrene sulfonate) layer pair formed in 0.5 M NaCl was found to be 2-3 nm. REFERENCE COUNT: 33

L2 ANSWER 6 OF 38 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2003:666531 CAPLUS

DOCUMENT NUMBER: 140:326907

TITLE: Biofunctional polyelectrolyte multiplayer surfaces

AUTHOR(S): Schlenoff, Joseph B.; Salloum, David S.; Jaber, Jad A.; Chase, Bryant

CORPORATE SOURCE: Department of Chemistry and Biochemistry, The Florida State University, Tallahassee, FL, USA

SOURCE: Polymeric Materials Science and Engineering (2003), 89, 75-76

CODEN: PMSEDG; ISSN: 0743-0515

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal; (computer optical disk)

LANGUAGE: English

AB The use of polyelectrolyte multilayers in producing patterns on surfaces to direct the motor protein actin was studied. Polyelectrolytes such as polyallylamine, poly(acrylic acid), etc., were used. REFERENCE COUNT: 17

L2 ANSWER 17 OF 38 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:234115 CAPLUS

DOCUMENT NUMBER: 136:386835

TITLE: Influence of Adsorption Conditions on the Structure of Polyelectrolyte Multilayers

AUTHOR(S): Buescher, Karsten; Graf, Karlheinz; Ahrens, Heiko; Helm, Christiane A.

CORPORATE SOURCE: Angewandte Physik, Universitaet Greifswald, Greifswald, D-17487, Germany

SOURCE: Langmuir (2002), 18(9), 3585-3591

CODEN: LANGD5; ISSN: 0743-7463

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Polyelectrolyte adsorption onto an oppositely charged interface is determined by electrostatic and secondary interactions. Since polyelectrolytes precipitate at elevated temps., the secondary interactions are presumably temperature dependent. This idea is tested for poly(allylamine) hydrochloride/polystyrene sulfonate (PAH/PSS) films adsorbed from aqueous KCl solution (high salt conditions) at temps. between 5 and 40

°C. KCl was chosen because the films were thicker than those obtained from NaCl or CsCl solns. indicating strong specific binding between K and PSS. The film thickness increases continuously with the adsorption temperature; the changes amount to 20-40%, depending on salt conditions. Furthermore, the roughness is increased, up to a factor of 5. The latter is attributed to the decreased percentage of strong electrostatic bonds within the polyelectrolyte multilayer. Another path to increased roughening is using low-weight polymers with a contour length similar to the thickness of a polycation/polyanion pair.

REFERENCE COUNT: 29

L2 ANSWER 18 OF 38 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:171658 CAPLUS

DOCUMENT NUMBER: 136:221720

TITLE: Controlled and sustained release properties of polyelectrolyte multilayer capsules

INVENTOR(S): Antipov, Alexei; Vieira, Euridice; Ibarz, Gemma; Sukhorukov, Gleb; Daehne, Lars; Gao, Changyou; Donath, Edwin; Moehwald, Helmuth

PATENT ASSIGNEE(S): Max-Planck-Gesellschaft zur Foerderung der Wissenschaften E. V., Germany

SOURCE: PCT Int. Appl., 59 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

PATENT NO. KIND DATE APPLICATION NO. DATE

WO 2002017888 A2 20020307 WO 2001-EP9908 20010828

WO 2002017888 C2 20030515 WO 2002017888 A3 20020725

EP 1313455 A2 20030528 EP 2001-980290 20010828

JP 2004507488 T2 20040311 JP 2002-522862 20010828

US 2004013721 A1 20040122 US 2003-363472 20030630

PRIORITY APPLN. INFO.: EP 2000-118615 A 20000828 EP 2001-112600 A 20010523 WO 2001-EP9908 W 20010828

AB Method of layer-by-layer (LbL) assembly of oppositely charged polyelectrolytes was applied to coat fluorescein particles. These particles with a size of 4-9 <SYM109>m were prepared by precipitation of fluorescein at pH 2. Polystyrene sulfonate (PSS) and polyallylamine (PAH) were used to compose the polyelectrolyte shell on the fluorescein core. The release of fluorescein mols. through the polyelectrolyte shell core dissoln. was monitored at pH 8 by increasing fluorescence intensity. The number of polyelectrolyte layers sufficient to sustain fluorescence release was found to be 8-10. Sequentially adsorbed layers prolong core dissoln. time for minutes. The permeability of polyelectrolyte multilayers of the thickness of 20 nm is about 10-8m/s. The features of release profile and possible applications of LbL method for shell formation in order to control release properties for entrapped materials are outlined. Also ambient conditions of pH, temperature and salt concentration were changed to control the permeability of polyelectrolyte multilayer capsules.

L2 ANSWER 30 OF 38 CAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2000:182034 CAPLUS

DOCUMENT NUMBER: 132:309331

TITLE: Adhesion of layer-by-layer-deposited polyelectrolyte assemblies to charged substrates

AUTHOR(S): Hsieh, Meng C.; Farris, Richard J.; McCarthy, Thomas J.

CORPORATE SOURCE: Polymer Science and Engineering Department, University of Massachusetts, Amherst, MA, 01003, USA

SOURCE: Polymeric Materials Science and Engineering (2000), 82, 213-214

CODEN: PMSEDG; ISSN: 0743-0515

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB In order to study the effect of charge d. on the adhesion strength of the layer-by-layer assembly, two approaches are taken to produce low and high degrees of surface charge on low d. polyethylene (LDPE): chromic acid oxidation and Au coating followed by long-chain thiol adsorption. Polyallylamine and poly(styrene sulfonate) are alternately adsorbed onto these surfaces to form layer-by-layer assemblies. Once the nano-assemblies are formed, the samples are uniaxially deformed at a constant rate and examined by electron microscopy. The adhesion strength of the layer-by-layer assembly is obtained by analyzing the crack spacing of the layer-by-layer assembly fragments.

REFERENCE COUNT: 40